

APPENDIX B

Outlet Field Data



B1 – THC Measurements and Calibration Data



EMISSION RATE CALCULATION SHEET
TOTAL HYDROCARBON EMISSIONS

Client/Site:	Global	Run #:	Run 1
Source:	RTO Outlet	Date:	4-Feb-10

START TIME :	6:45	END TIME :	7:45
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AVERAGE CONCENTRATION	5.2 PPM
AVERAGE FLOW RATE	6,665 WSCFM
MOLECULAR WEIGHT (Propane)	44.09 g/mole

$$\text{mg/m}^3 = (\text{MW} * \text{PPM}) / (24.055 \text{ l/mol. PPM}) = 9.55 \text{ mg/m}^3$$

$$\text{mg/SCF} = (\text{mg/m}^3) (\text{m}^3/35.31 \text{ SCF}) = 0.27 \text{ mg/SCF}$$

$$\text{lb/SCF} = (1 \text{ lb} / 4.536\text{E}+5 \text{ mg}) * (\text{mg/SCF}) = 5.962\text{E}-07 \text{ lb/SCF}$$

$$\text{lb/hr} = (\text{lb/SCF} * \text{WSCFM} * 60 \text{ min/hr}) = 0.24 \text{ lb/hr}$$

EMISSION RATE CALCULATION SHEET
TOTAL HYDROCARBON EMISSIONS

Client/Site:	Global	Run #:	Run 2
Source:	RTO Outlet	Date:	4-Feb-10

START TIME :	8:05	END TIME :	9:05
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AVERAGE CONCENTRATION	5.8 PPM
AVERAGE FLOW RATE	6,896 WSCFM
MOLECULAR WEIGHT (Propane)	44.09 g/mole

$$\text{mg/m}^3 = (\text{MW} * \text{PPM}) / (24.055 \text{ l/mol. PPM}) = 10.65 \text{ mg/m}^3$$

$$\text{mg/SCF} = (\text{mg/m}^3) (\text{m}^3/35.31 \text{ SCF}) = 0.30 \text{ mg/SCF}$$

$$\text{lb/SCF} = (1 \text{ lb} / 4.536\text{E}+5 \text{ mg}) * (\text{mg/SCF}) = 6.649\text{E}-07 \text{ lb/SCF}$$

$$\text{lb/hr} = (\text{lb/SCF} * \text{WSCFM} * 60 \text{ min/hr}) = 0.28 \text{ lb/hr}$$

EMISSION RATE CALCULATION SHEET
TOTAL HYDROCARBON EMISSIONS

Client/Site:	Global	Run #:	Run 3
Source:	RTO Outlet	Date:	4-Feb-10

START TIME :	9:25	END TIME :	10:25
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AVERAGE CONCENTRATION	6.8 PPM
AVERAGE FLOW RATE	6,634 WSCFM
MOLECULAR WEIGHT (Propane)	44.09 g/mole

$$\text{mg/m}^3 = (\text{MW} * \text{PPM}) / (24.055 \text{ l/mol. PPM}) = 12.46 \text{ mg/m}^3$$

$$\text{mg/SCF} = (\text{mg/m}^3) (\text{m}^3/35.31 \text{ SCF}) = 0.35 \text{ mg/SCF}$$

$$\text{lb/SCF} = (1 \text{ lb} / 4.536\text{E}+5 \text{ mg}) * (\text{mg/SCF}) = 7.782\text{E}-07 \text{ lb/SCF}$$

$$\text{lb/hr} = (\text{lb/SCF} * \text{WSCFM} * 60 \text{ min/hr}) = 0.31 \text{ lb/hr}$$

Eastmount Environmental Services, LLC
 UNCORRECTED CEM MONITORING RESULTS
 INSTRUMENTAL REFERENCE METHODS - 25A/18

CLIENT: / SITE: Global
 SOURCE: RTO

CONDITION: Normal
 RUN ID: RTO - Run 1

Date	Time	O2 %	CO2 %	Inlet THC ppm	Outlet THC ppm
04-Feb-2010	06:45	19.73	0.49	768.00	2.94
04-Feb-2010	06:46	19.69	0.52	769.82	1.60
04-Feb-2010	06:47	19.68	0.52	769.42	1.15
04-Feb-2010	06:48	19.66	0.51	770.77	0.33
04-Feb-2010	06:49	19.40	0.77	780.57	0.11
04-Feb-2010	06:50	18.83	1.12	775.84	0.03
04-Feb-2010	06:51	18.84	1.09	778.53	0.10
04-Feb-2010	06:52	19.61	0.52	787.98	36.50
04-Feb-2010	06:53	19.67	0.51	772.29	3.56
04-Feb-2010	06:54	19.70	0.52	772.30	1.87
04-Feb-2010	06:55	19.71	0.52	772.76	1.09
04-Feb-2010	06:56	19.69	0.51	779.09	0.78
04-Feb-2010	06:57	19.70	0.54	778.79	0.13
04-Feb-2010	06:58	19.05	1.02	782.79	0.12
04-Feb-2010	06:59	18.82	1.12	799.92	0.18
04-Feb-2010	07:00	19.55	0.56	805.33	37.04
04-Feb-2010	07:01	19.64	0.54	819.91	3.60
04-Feb-2010	07:02	19.61	0.55	820.28	1.83
04-Feb-2010	07:03	19.59	0.57	847.97	1.14
04-Feb-2010	07:04	19.57	0.58	883.20	0.29
04-Feb-2010	07:05	19.44	0.73	893.21	0.06
04-Feb-2010	07:06	18.69	1.23	905.53	0.15
04-Feb-2010	07:07	18.67	1.24	961.97	0.11
04-Feb-2010	07:08	19.32	0.72	1032.47	38.45
04-Feb-2010	07:09	19.52	0.64	1056.61	4.02
04-Feb-2010	07:10	19.52	0.62	1028.95	2.19
04-Feb-2010	07:11	19.50	0.65	1024.56	1.41
04-Feb-2010	07:12	19.52	0.63	1030.04	1.12
04-Feb-2010	07:13	19.51	0.62	1000.71	0.05
04-Feb-2010	07:14	19.22	0.90	991.05	0.11
04-Feb-2010	07:15	18.70	1.19	989.85	0.05
04-Feb-2010	07:16	19.37	0.70	912.18	34.68
04-Feb-2010	07:17	19.63	0.58	809.19	3.93
04-Feb-2010	07:18	19.67	0.54	785.35	1.85
04-Feb-2010	07:19	19.65	0.55	771.53	1.04
04-Feb-2010	07:20	19.67	0.54	750.36	0.67
04-Feb-2010	07:21	19.65	0.57	748.82	0.06
04-Feb-2010	07:22	18.90	1.16	762.47	0.09
04-Feb-2010	07:23	18.81	1.19	762.57	0.37
04-Feb-2010	07:24	19.39	0.71	768.62	32.71
04-Feb-2010	07:25	19.63	0.57	783.74	4.15
04-Feb-2010	07:26	19.59	0.58	806.61	2.21
04-Feb-2010	07:27	19.60	0.59	805.32	1.25
04-Feb-2010	07:28	19.56	0.58	804.11	1.17
04-Feb-2010	07:29	19.51	0.60	802.66	0.11
04-Feb-2010	07:30	19.38	0.72	829.60	0.24
04-Feb-2010	07:31	18.65	1.20	818.73	0.27
04-Feb-2010	07:32	19.13	0.77	815.59	30.97
04-Feb-2010	07:33	19.43	0.59	817.34	4.59
04-Feb-2010	07:34	19.41	0.58	819.48	2.13
04-Feb-2010	07:35	19.37	0.59	802.01	1.04
04-Feb-2010	07:36	19.37	0.58	806.68	0.88
04-Feb-2010	07:37	19.36	0.56	788.68	0.24
04-Feb-2010	07:38	18.73	1.06	763.61	0.18
04-Feb-2010	07:39	18.49	1.20	758.17	0.29
04-Feb-2010	07:40	18.90	0.80	766.40	35.46
04-Feb-2010	07:41	19.29	0.59	761.94	4.62
04-Feb-2010	07:42	19.30	0.57	761.62	2.36
04-Feb-2010	07:43	19.31	0.59	765.82	1.50
04-Feb-2010	07:44	19.27	0.57	760.90	1.13

AVERAGES: 19.36 0.71 827.68 5.21

Eastmount Environmental Services, LLC
 UNCORRECTED CEM MONITORING RESULTS
 INSTRUMENTAL REFERENCE METHODS - 25A/18

CLIENT: / SITE: Global
 SOURCE: RTO

CONDITION: Normal
 RUN ID: RTO - Run 2

Date	Time	O2 %	CO2 %	Inlet THC ppm	Outlet THC ppm
04-Feb-2010	08:05	19.72	0.64	789.55	5.83
04-Feb-2010	08:06	19.72	0.64	813.26	2.37
04-Feb-2010	08:07	19.92	0.64	826.89	1.23
04-Feb-2010	08:08	20.10	0.64	850.37	0.97
04-Feb-2010	08:09	20.14	0.64	876.72	0.16
04-Feb-2010	08:10	19.66	1.02	886.23	0.00
04-Feb-2010	08:11	19.30	1.27	882.76	0.15
04-Feb-2010	08:12	19.57	0.99	891.60	35.19
04-Feb-2010	08:13	20.16	0.64	888.41	6.13
04-Feb-2010	08:14	20.15	0.66	891.33	2.88
04-Feb-2010	08:15	20.11	0.64	892.18	1.65
04-Feb-2010	08:16	20.13	0.70	882.54	0.95
04-Feb-2010	08:17	20.12	0.61	860.39	0.16
04-Feb-2010	08:18	19.71	0.93	830.28	0.10
04-Feb-2010	08:19	19.19	1.25	818.82	0.16
04-Feb-2010	08:20	19.92	0.67	830.63	36.79
04-Feb-2010	08:21	20.03	0.61	834.72	3.51
04-Feb-2010	08:22	20.10	0.62	837.35	1.68
04-Feb-2010	08:23	20.05	0.60	838.28	1.13
04-Feb-2010	08:24	20.03	0.63	831.76	0.54
04-Feb-2010	08:25	19.96	0.65	836.08	0.15
04-Feb-2010	08:26	19.14	1.24	853.50	0.03
04-Feb-2010	08:27	19.10	1.22	839.37	0.19
04-Feb-2010	08:28	19.76	0.69	836.76	34.40
04-Feb-2010	08:29	19.88	0.64	822.41	3.95
04-Feb-2010	08:30	19.86	0.63	843.41	2.20
04-Feb-2010	08:31	19.85	0.61	862.66	1.30
04-Feb-2010	08:32	19.89	0.62	833.36	1.04
04-Feb-2010	08:33	19.90	0.61	833.91	0.21
04-Feb-2010	08:34	19.59	0.89	846.52	0.05
04-Feb-2010	08:35	19.03	1.22	839.58	0.16
04-Feb-2010	08:36	19.70	0.73	839.31	36.24
04-Feb-2010	08:37	19.95	0.64	836.32	4.02
04-Feb-2010	08:38	20.01	0.65	840.26	1.93
04-Feb-2010	08:39	20.04	0.63	833.65	1.20
04-Feb-2010	08:40	20.07	0.63	821.12	0.89
04-Feb-2010	08:41	20.09	0.62	811.16	0.18
04-Feb-2010	08:42	19.31	1.21	847.33	0.14
04-Feb-2010	08:43	19.16	1.28	845.82	0.13
04-Feb-2010	08:44	19.78	0.81	902.61	36.15
04-Feb-2010	08:45	20.07	0.66	941.10	4.36
04-Feb-2010	08:46	20.07	0.69	934.73	2.25
04-Feb-2010	08:47	20.12	0.68	940.08	1.55
04-Feb-2010	08:48	20.15	0.65	954.37	1.13
04-Feb-2010	08:49	20.17	0.68	944.11	0.24
04-Feb-2010	08:50	20.17	0.74	936.27	0.06
04-Feb-2010	08:51	19.36	1.29	936.17	0.20
04-Feb-2010	08:52	19.85	0.86	916.52	38.26
04-Feb-2010	08:53	20.23	0.67	926.27	4.81
04-Feb-2010	08:54	20.21	0.67	910.11	2.24
04-Feb-2010	08:55	20.24	0.67	888.16	1.24
04-Feb-2010	08:56	20.20	0.64	875.11	1.00
04-Feb-2010	08:57	20.15	0.66	868.91	0.13
04-Feb-2010	08:58	19.64	1.05	864.16	0.18
04-Feb-2010	08:59	19.25	1.28	861.32	0.15
04-Feb-2010	09:00	19.66	0.85	883.11	42.85
04-Feb-2010	09:01	20.09	0.64	875.22	4.67
04-Feb-2010	09:02	20.03	0.64	872.09	2.42
04-Feb-2010	09:03	20.00	0.65	854.46	1.43
04-Feb-2010	09:04	20.06	0.55	862.48	1.00
AVERAGES:		19.85	0.78	865.67	5.81

Eastmount Environmental Services, LLC
 UNCORRECTED CEM MONITORING RESULTS
 INSTRUMENTAL REFERENCE METHODS - 25A/18

CLIENT: / SITE: Global
 SOURCE: RTO

CONDITION: Normal
 RUN ID: RTO - Run 3

Date	Time	O2 %	CO2 %	Inlet THC ppm	Outlet THC ppm
04-Feb-2010	09:25	19.85	0.68	832.13	36.52
04-Feb-2010	09:26	19.95	0.66	836.49	2.86
04-Feb-2010	09:27	20.00	0.68	830.87	1.40
04-Feb-2010	09:28	20.00	0.65	835.20	1.20
04-Feb-2010	09:29	19.97	0.67	808.15	0.45
04-Feb-2010	09:30	19.96	0.72	853.70	0.23
04-Feb-2010	09:31	19.14	1.27	838.35	0.19
04-Feb-2010	09:32	19.05	1.25	819.31	0.11
04-Feb-2010	09:33	19.89	0.65	845.08	38.07
04-Feb-2010	09:34	19.87	0.65	828.44	3.54
04-Feb-2010	09:35	19.88	0.66	835.44	1.89
04-Feb-2010	09:36	19.82	0.63	840.85	1.17
04-Feb-2010	09:37	19.83	0.67	839.96	0.84
04-Feb-2010	09:38	19.83	0.67	845.63	0.11
04-Feb-2010	09:39	19.59	0.92	847.91	0.21
04-Feb-2010	09:40	18.95	1.27	854.75	0.09
04-Feb-2010	09:41	19.68	0.68	859.75	35.74
04-Feb-2010	09:42	19.80	0.70	859.36	3.34
04-Feb-2010	09:43	19.82	0.68	874.52	1.62
04-Feb-2010	09:44	19.83	0.66	856.31	1.14
04-Feb-2010	09:45	19.85	0.65	866.79	0.89
04-Feb-2010	09:46	19.85	0.69	839.09	0.09
04-Feb-2010	09:47	19.28	1.15	849.47	0.07
04-Feb-2010	09:48	18.97	1.29	856.10	0.23
04-Feb-2010	09:49	19.68	0.74	856.56	79.57
04-Feb-2010	09:50	19.90	0.66	852.95	3.81
04-Feb-2010	09:51	19.92	0.66	844.12	2.14
04-Feb-2010	09:52	19.91	0.65	850.97	1.12
04-Feb-2010	09:53	19.94	0.65	841.01	1.16
04-Feb-2010	09:54	19.90	0.66	855.00	0.25
04-Feb-2010	09:55	19.86	0.75	851.07	0.11
04-Feb-2010	09:56	18.97	1.32	854.99	0.18
04-Feb-2010	09:57	19.61	0.78	877.22	36.78
04-Feb-2010	09:58	19.87	0.66	869.19	3.92
04-Feb-2010	09:59	19.86	0.66	837.22	1.84
04-Feb-2010	10:00	19.84	0.66	847.74	1.14
04-Feb-2010	10:01	19.84	0.66	866.38	0.94
04-Feb-2010	10:02	19.80	0.64	854.62	0.13
04-Feb-2010	10:03	19.36	1.06	877.21	0.14
04-Feb-2010	10:04	18.86	1.31	883.13	0.19
04-Feb-2010	10:05	19.49	0.77	867.67	34.14
04-Feb-2010	10:06	19.77	0.66	858.81	4.06
04-Feb-2010	10:07	19.72	0.65	882.02	2.15
04-Feb-2010	10:08	19.73	0.68	877.91	1.26
04-Feb-2010	10:09	19.73	0.67	893.97	1.22
04-Feb-2010	10:10	19.73	0.66	893.65	0.42
04-Feb-2010	10:11	19.68	0.67	891.66	0.24
04-Feb-2010	10:12	18.95	1.28	898.60	0.09
04-Feb-2010	10:13	19.37	0.85	891.42	34.83
04-Feb-2010	10:14	19.73	0.69	888.55	4.10
04-Feb-2010	10:15	19.75	0.67	897.95	1.79
04-Feb-2010	10:16	19.78	0.68	896.33	1.22
04-Feb-2010	10:17	19.82	0.68	891.41	1.10
04-Feb-2010	10:18	19.88	0.68	902.52	0.06
04-Feb-2010	10:19	19.56	1.00	886.94	0.11
04-Feb-2010	10:20	19.07	1.30	885.77	0.01
04-Feb-2010	10:21	19.60	0.87	880.29	47.43
04-Feb-2010	10:22	19.96	0.67	901.02	4.43
04-Feb-2010	10:23	20.04	0.67	869.53	2.32
04-Feb-2010	10:24	20.05	0.65	861.45	1.33

AVERAGES: 19.69 0.79 861.51 6.80

Method 25A Calibration Data Sheet - Outlet

Source Summary

Client/Site:	Global
Source/Location:	RTO Outlet
Test Date:	4-Feb-10

Field Crew Summary

Crew Member 1 -	A. Seaha
Crew Member 2 -	M. Bruni
Crew Member 3 -	
Crew Member 4 -	

Calibration Error Test Data

Calibration Gas	Cylinder Concentration	Actual Response
Zero Gas	0	0
High Gas	897	896
Response Line	0.999	

$$\text{Response Line} = (\text{Ha} - \text{Za}) / (\text{Hc} - \text{Zc})$$

Calibration Gas	Cylinder Concentration	Predicted Response	Actual Response	Calibration Error	Acceptance Criteria
Low Gas	300	300	300	0.1	< 5% of cylinder concentration
Mid Gas	508	507	516	1.7	< 5% of cylinder concentration

Where:

$$\text{Predicted Response} = (\text{Cylinder Concentration}) \times (\text{Response Line})$$

$$\text{Calibration Error} = (\text{Actual Response} - \text{Predicted Response}) / \text{Cylinder Concentration} \times 100$$

Calibration Drift Test Data

Calibration Gas	Cylinder Concentration	Initial Test Response	Final Test Response	Calibration Drift	Acceptance Criteria
Test Run 1 Zero	0	0	0	0.0	< 3% of the measurement range
Test Run 1 Mid	300	300	298	0.2	< 3% of the measurement range
					Test Run 1 Avg. Conc. 5.2
Test Run 2 Zero	0	0	0	0.0	< 3% of the measurement range
Test Run 2 Mid	300	300	293	0.7	< 3% of the measurement range
					Test Run 2 Avg. Conc. 5.8
Test Run 3 Zero	0	0	0	0.0	< 3% of the measurement range
Test Run 3 Mid	300	300	293	0.7	< 3% of the measurement range
					Test Run 3 Avg. Conc. 6.8

Where:

$$\text{Calibration Drift} = \frac{(\text{Final Test Response} - \text{Initial Test Response})}{\text{Measurement Range}} \times 100$$

Gas Cylinder Data

Calibration Gas	Required % of Span	Cylinder Concentration	Cylinder Composition	Cylinder Number	Expiration Date	Actual % of Span
Fuel	N/A		UHP H2			N/A
Combustion Air			UHP Air			
Zero Gas			UHP Air			
Low Gas	25-35					0.0%
Mid Gas	45-55					0.0%
High Gas	80-90					0.0%

CEMS System Response Time = 15 seconds

THC Analyzer Data

Manufacturer -		TECO	
Model/Serial Number -		51	
Fuel Pressure -		29	
Combustion Air Pressure -		30	
Sample Pressure -		9.0	
Range -		0	- 1,000
Calibrant (choose one, x in box)	Propane	x	
	Methane	0	
Program Molecular Weight:		44.09	g/mol

Run Summary

Run No.	1	2	3
Start Time	6:45	8:05	9:25
Stop Time	7:45	9:05	10:25

Method 25A Data Sheet

Client CAA / Global Oil
 Facility Chelsea, MA
 Source RTO
 Test Location Outlet
 Date 2/4/10

THC Analyzer Data

Manufacturer TECO
 Model/Serial Number 51 / 46012-275
 Fuel Pressure 29
 Combustion Air Pressure 30
 Sample Pressure 9
 Measurement Range 0 - 1,000 C3H8
 Response Time 15 sec

Calibration Error Test Data		
Calibration Gas	Cylinder Concentration	Actual Response
Zero Gas	0	0
High Gas	897	896
Response Line	6.999	
Response Line = (Ha/Za)/(Hc-Zc)		

Test Data

Test Number
 Start Time
 Stop Time
 Testers

1	2	3
645	805	925
745	905	1025

Calibration Gas	Cylinder Concentration	Predicted Response	Actual Response	Calibration Error	Criteria Acceptance
Low Gas	300	300	300	0.1	< 5% of cylinder concentration
Mid Gas	508	507	516	1.7	< 5% of cylinder concentration

Predicted Response = (Cylinder Concentration) x (Response Line)

Calibration Error = (Actual Response - Predicted Response) / Cylinder Concentration x 100

30.9

32.1

Calibration Drift Test Data					
Calibration Gas	Cylinder Concentration	CE Test Response	Actual Response	Calibration Drift	Criteria Acceptance
Test Run 1 Zero	0	0	0	0.0	< 3% of the measurement range
Test Run 1 Mid	300	300	298	0.2	< 3% of the measurement range
	30.9	32.1	31.4		Test Run 1 Avg. Conc. 5.21
Test Run 2 Zero	0	0	0	0.0	< 3% of the measurement range
Test Run 2 Mid	300	300	293	0.87	< 3% of the measurement range
	30.9	32.1	31.9		Test Run 2 Avg. Conc. 5.81
Test Run 3 Zero	0	0	0	0.0	< 3% of the measurement range
Test Run 3 Mid	300	300	293	0.7	< 3% of the measurement range
					Test Run 3 Avg. Conc. 6.80
Calibration Drift = (Actual Response - CE Test Response) * 100 / Measurement Range					

31.3

Gas Cylinder Data						
Calibration Gas	Required % of Span	Cylinder Concentration	Cylinder Composition	Cylinder Number	Expiration Date	Actual % of Span
Fuel			UHP H2			
Combustion Air			UHP Air			
Low Gas	25 - 35	300	C3H8 / Air	CC192087		30.0
Mid Gas	45 - 55	508		CC13336		50.8
High Gas	80 - 90	897		CC5920273A		89.7

B2 – Methane Measurements and Calibration Data



EMISSION RATE CALCULATION SHEET METHANE EMISSIONS

PLANT : Global	RUN : Run 1
LOCATION : RTO Outlet	DATE : 04-Feb-10

START TIME :	6:45	END TIME :	7:45
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AVERAGE CONCENTRATION	2.5	PPM
AVERAGE FLOW RATE	6665	WSCFM
MOLECULAR WEIGHT (METHANE)	16.04	g/mole

mg/m3 = (MW * PPM) / (24.055 l/mol. PPM) =	1.67	mg/m3
mg/SCF = (mg/m3) (m3/35.31 SCF) =	0.05	mg/SCF
lb/SCF = (1 lb/ 4.536E+5 mg) * (mg/SCF) =	1.041E-07	lb/SCF
lb/hr = (lb/SCF * WSCFM * 60 min/hr) =	0.04	lb/hr

EMISSION RATE CALCULATION SHEET

METHANE EMISSIONS

PLANT : Global	RUN : Run 2
LOCATION : RTO Outlet	DATE : 04-Feb-10

START TIME :	8:05	END TIME :	9:05
--------------	------	------------	------

AVERAGE CONCENTRATION	3.2	PPM
AVERAGE FLOW RATE	6896	WSCFM
MOLECULAR WEIGHT (METHANE)	16.04	g/mole

mg/m3 =	(MW * PPM) / (24.055 l/mol. PPM) =	2.10	mg/m3
mg/SCF =	(mg/m3) (m3/35.31 SCF)	=	0.06 mg/SCF
lb/SCF =	(1 lb/ 4.536E+5 mg) * (mg/SCF)	=	1.311E-07 lb/SCF
lb/hr =	(lb/SCF * WSCFM * 60 min/hr)	=	0.05 lb/hr

EMISSION RATE CALCULATION SHEET

METHANE EMISSIONS

PLANT : Global	RUN : Run 3
LOCATION : RTO Outlet	DATE : 04-Feb-10

START TIME :	9:25	END TIME :	10:25
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AVERAGE CONCENTRATION	3.1	PPM
AVERAGE FLOW RATE	6634	WSCFM
MOLECULAR WEIGHT (METHANE)	16.04	g/mole

mg/m3 =	(MW * PPM) / (24.055 l/mol. PPM) =	2.03	mg/m3
mg/SCF =	(mg/m3) (m3/35.31 SCF)	=	0.06 mg/SCF
lb/SCF =	(1 lb/ 4.536E+5 mg) * (mg/SCF)	=	1.27E-07 lb/SCF
lb/hr =	(lb/SCF * WSCFM * 60 min/hr)	=	0.05 lb/hr

Method 18 Data Sheet

Client CAA / Global
 Facility Chelsea, MA
 Source pro
 Test Location outlet
 Date 2/4/10
 Testers AS, MB

GC Manufacturer VIG
 Model/Serial Number 2001
 Fuel Pressure 6
 Combustion Air Pressure 6
 Sample Pressure 15/3
 Measurement Range 0-100 CH4

Calibration Gas Values

Low Gas 29.8
 Mid Gas 50.0
 High Gas 86.2

Test Data

Test Number	1	2	3
Start Time	645	805	925
Stop Time	745	905	1025

Pre-Test Calibration					
Calibration Gas	Injection 1	Injection 2	Injection 3	3 Injection Average	Criteria Acceptance
Low Gas	29.0	29.0	29.1		< 5% of mean value
Mid Gas	50.3	49.9	49.9		< 5% of mean value
High Gas	86.1	85.9	85.9		< 5% of mean value

Test Data					
Calibration Gas	Cylinder Concentration	GC Response	Drift	Test Run Avg. Conc.	Criteria Acceptance
Test Run 1 Zero	0.0	0.2		2.5/2.5	< 5% of initial cal value
Test Run 1 Mid	29.8	29.1			< 5% of initial cal value
Test Run 2 Zero	0.0	0.2		3.2/3.1	< 5% of initial cal value
Test Run 2 Mid	29.8	29.2			< 5% of initial cal value
Test Run 3 Zero	0.0	0.2		3.1/3.0	< 5% of initial cal value
Test Run 3 Mid	29.8	29.2			< 5% of initial cal value

Post-Test Calibration					
Calibration Gas	Injection 1	Injection 2	Injection 3	3 Injection Average	Criteria Acceptance
Low Gas	29.2	29.0	29.0	29.1	< 5% of initial cal value
Mid Gas					< 5% of initial cal value
High Gas					< 5% of initial cal value

B3 – Flow Measurement Data



VOLUMETRIC FLOW CALCULATIONS

Client/Site:	Global	Run #:	Run 1
Source:	RTO Outlet	Date:	4-Feb-10

Trav. Point	Delta P	SQ Root Delta P	Stack Temp
A1	0.40	0.63	112
2	0.47	0.69	151
3	0.49	0.70	165
4	0.48	0.69	191
5	0.53	0.73	212
6	0.45	0.67	226
B1	0.44	0.66	228
2	0.48	0.69	263
3	0.56	0.75	297
4	0.42	0.65	136
5	0.52	0.72	111
6	0.54	0.73	98
Average	0.48	0.69	182.5

Average Delta P	0.48
Average Stack Temp	182.5
Bwo (via mod. M4)	0.010
Barometric Press	30.0
P Static	-0.39
% CO2	0.55
% O2	19.66
% CO	0
% N2	79.8
Stack Dia (ft)	2.00
L	0.00
W	0.00
Stack Area	3.14 sq ft
Cp	0.84
Md	28.87
Ms	28.77

G	0.86	
VS	42.97	FPS
Qs	395,979	DSCFH
	399,902	WSCFH
	6,665	WSCFM
	6,600	DSCFM
	8,100	ACFM

Equations:

$T_s = \text{Temp Stack} + 460$
 $P_s = P_{\text{static}}/13.6 + B_p$
 $M_d = .44 \text{ CO}_2 + .32 \text{ O}_2 + .28 \text{ CO} + .28 \text{ N}_2$
 $M_s = M_d(1 - B_{wo}) + 18(B_{wo})$
 $G = \sqrt{T_s / (P_s / M_s)}$
 $V_s = 85.9(C_p)(G)(\text{Ave Sqrt Delta P})$
 $A_s = \text{either } D^2(PI)/4 \text{ or } (L)(W)$
 $Q_s = 3600(1 - B_{wo})(V_s)(A_s)17.64(P_s)/(T_s)$

VOLUMETRIC FLOW CALCULATIONS

Plant:	Global	Run #:	Run 2
Location:	RTO Outlet	Date:	4-Feb-10

Trav. Point	Delta P	SQ Root Delta P	Stack Temp
A1	0.38	0.62	80
2	0.42	0.65	82
3	0.45	0.67	86
4	0.40	0.63	88
5	0.43	0.66	98
6	0.42	0.65	105
B1	0.38	0.62	132
2	0.42	0.65	157
3	0.47	0.69	173
4	0.60	0.77	202
5	0.72	0.85	220
6	0.74	0.86	253
Average	0.49	0.69	139.7

Average Delta P	0.49
Average Stack Temp	139.7
Bwo (via mod M4)	0.013
Barometric Press	30.0
P Static	0.30
% CO2	0.55
% O2	20.08
% CO	0
% N2	79.4
Stack Dia (ft)	2.00
L	0.00
W	0.00
Stack Area	3.14 sq ft
Cp	0.84
Md	28.89
Ms	28.75

G	0.83	
VS	41.43	FPS
Qs	408,368	DSCFH
	413,772	WSCFH
	6,896	WSCFM
	6,806	DSCFM
	7,809	ACFM

Equations:

$T_s = \text{Temp Stack} + 460$
 $P_s = P_{\text{static}}/13.6 + B_p$
 $M_d = .44 \text{ CO}_2 + .32 \text{ O}_2 + .28 \text{ CO} + .28 \text{ N}_2$
 $M_s = M_d(1-Bwo) + 18(Bwo)$
 $G = \text{Sqrt}(T_s/P_s/M_s)$
 $V_s = 85.9(C_p)(G)(\text{Ave Sqrt Delta P})$
 $A_s = \text{either } D^2(PI)/4 \text{ or } (L)(W)$
 $Q_s = 3600(1-Bwo)(V_s)(A_s)/17.64(P_s)/(T_s)$

VOLUMETRIC FLOW CALCULATIONS

Plant:	Global	Run #:	Run 3
Location:	RTO Outlet	Date:	4-Feb-10

Trav. Point	Delta P	SQ Root A	Stack Temp
A1	0.48	0.69	110
2	0.48	0.69	121
3	0.41	0.64	139
4	0.44	0.66	155
5	0.46	0.68	168
6	0.44	0.66	174
B1	0.46	0.68	200
2	0.50	0.71	226
3	0.51	0.71	266
4	0.48	0.69	274
5	0.62	0.79	284
6	0.61	0.78	295
Average	0.49	0.70	201.0

Average Delta P	0.49
Average Stack Temp	201.0
Bwo	0.008
Barometric Press	30.0
P Static	0.30
% CO2	0.49
% O2	19.66
% CO	0.00
% N2	79.9
Stack Dia (ft)	2.00
L	0.00
W	0.00
Stack Area	3.14 sq ft
Cp	0.84
Md	28.86
Ms	28.77

G	0.87	
VS	43.93	FPS
Qs	394,726	DSCFH
	398,041	WSCFH
	6,634	WSCFM
	6,579	DSCFM
	8,280	ACFM

Equations:

$T_s = \text{Temp Stack} + 460$
 $P_s = P_{\text{static}}/13.6 + B_p$
 $M_d = .44 \text{ CO}_2 + .32 \text{ O}_2 + .28 \text{ CO} + .28 \text{ N}_2$
 $M_s = M_d(1 - B_{wo}) + 18(B_{wo})$
 $G = \text{Sqrt}(T_s/P_s/M_s)$
 $V_s = 85.9(C_p)(G)(\text{Ave Sqrt Delta P})$
 $A_s = \text{either } D^2(\pi)/4 \text{ or } (L)(W)$
 $Q_s = 3600(1 - B_{wo})(V_s)(A_s)/17.64(P_s)/(T_s)$

MOISTURE CALCULATIONS

PLANT: Global
LOCATION: RTO Outlet

RUN #: Run 1
DATE: 4-Feb-10

IMP-1 (INT) :	293
IMP-2 (INT) :	0
IMP-3 (INT) :	0
IMP-4 (INT) :	0
IMP-1 (FIN) :	293.5
IMP-2 (FIN) :	0.0
IMP-3 (FIN) :	0
IMP-4 (FIN) :	0
Pump #	N/A
Meterbox Y:	N/A
Pbar	30.0
TEST LENGTH	60
SAMPLE VOL (L)	67.278
SAMPLE VOL (M3)	0.06728
SAMPLE VOL (FT3)	2.376
BEGIN TIME	6:45
END TIME	7:45

VI tot =	IMP-1,2,3,4 (FIN) - IMP-1,2,3,4 (INT)	=	0.5 ml
Vm =	n/a	=	
Vm std =		=	2.376 dscf
Vw std =	0.04707 (VI TOT)	=	0.024 wcf
BWO =	Vw std / (Vw std) + (Vm std)	=	0.010
1-BWO =		=	0.990
% Moisture =		=	0.98 %

MOISTURE CALCULATIONS

PLANT: Global
LOCATION: RTO Outlet

RUN #: Run 2
DATE: 4-Feb-10

IMP-1 (INT) :	295.5
IMP-2 (INT) :	0
IMP-3 (INT) :	0
IMP-4 (INT) :	0
IMP-1 (FIN) :	296.0
IMP-2 (FIN) :	0
IMP-3 (FIN) :	0
IMP-4 (FIN) :	0
Pump #	N/A
Meterbox Y:	N/A
Pbar	30.0
TEST LENGTH	60
SAMPLE VOL (L)	50.358
SAMPLE VOL (M3)	0.05036
SAMPLE VOL (FT3)	1.778
BEGIN TIME	8:05
END TIME	9:05

VI tot =	IMP-1,2,3,4 (FIN) - IMP-1,2,3,4 (INT)	=	0.5 ml
Vm =	n/a	=	
Vm std =		=	1.778 dscf
Vw std =	0.04707 (VI TOT)	=	0.024 wcf
BWO =	Vw std / (Vw std) + (Vm std)	=	0.013
1-BWO =		=	0.987
% Moisture =		=	1.31 %

MOISTURE CALCULATIONS

PLANT: Global
LOCATION: RTO Outlet

RUN #: Run 3
DATE: 4-Feb-10

IMP-1 (INT) :	296.0
IMP-2 (INT) :	0
IMP-3 (INT) :	0
IMP-4 (INT) :	0
IMP-1 (FIN) :	296.5
IMP-2 (FIN) :	0
IMP-3 (FIN) :	0
IMP-4 (FIN) :	0
Pump #	N/A
Meterbox Y:	N/A
Pbar	30.0
TEST LENGTH	60
SAMPLE VOL (L)	79.352
SAMPLE VOL (M3)	0.07935
SAMPLE VOL (FT3)	2.802
BEGIN TIME	9:25
END TIME	10:25

VI tot =	IMP-1,2,3,4 (FIN) - IMP-1,2,3,4 (INT)	=	0.5 ml
Vm =	n/a	=	
Vm std =			2.802 dscf
Vw std =	0.04707 (VI TOT)	=	0.024 wcf
BWO =	Vw std / (Vw std) + (Vm std)	=	0.008
1-BWO =		=	0.992
% Moisture =		=	0.83 %

Analyzer Calibrations

PLANT :	Global		
LOCATION :	RTO Outlet	DATE :	4-Feb-10

Diluent/Pollutant	O ₂	CO ₂			
Analyzer Range	20.91	18.80			
Zero Response	0.28	0.10			
Calibration Error (% of Span)	1.34	0.53			
Cylinder Value (Mid)	10.85	9.70			
Analyzer Response (Mid)	11.10	9.73			
Calibration Error (% of Span)	1.20	0.16			
Cylinder Value (High)	20.91	18.80			
Analyzer Response (High)	20.99	18.84			
Calibration Error (% of Span)	0.38	0.21			
PASS - FAIL	PASS	PASS			
ZERO	0.28	0.10			
Use Mid or High Span (M or H)	M	M			
SPAN	11.10	9.73			

CEMS Calibrations and Calculations Sheet

PLANT : Global
LOCATION : RTO Outlet

RUN # : Run 1
DATE : 4-Feb-10

GAS

START TIME :

6:45

END TIME :

7:45

Diluent/Pollutant:	O ₂ (%)	CO ₂ (%)
Operating Range =	20.91	18.8
Analyzer Zero Response =	0.28	0.10
Analyzer Span Response =	11.10	9.73
Sytem Zero Response (Initial) =	0.46	0.15
System Zero Response (Final) =	0.45	0.18
Average Zero Response (C _o) =	0.46	0.17
Sytem Span Response (Initial) =	11.01	9.69
System Span Response (Final) =	10.77	9.76
Average Span Response (C _m) =	10.89	9.73
Calibration gas values (C _{ma}) =	10.85	9.70
<u>System Bias and Drift Calculations:</u>		
Zero Bias (Initial) =	0.86	0.27
Zero Bias (Final) =	0.81	0.43
Zero Drift =	0.05	0.16
Span Bias (Initial) =	0.43	0.21
Span Bias (Final) =	1.58	0.16
Span Drift =	1.15	0.37
Uncorrected Ave. (\bar{C}) =	19.36	0.71
Corrected Ave. = $C_{gas} = (\bar{C} - C_o)(C_{ma}/(C_m - C_o)) =$	19.66	0.55

CEMS Calibrations and Calculations Sheet

PLANT : Global
LOCATION : RTO Outlet

RUN # : Run 2
DATE : 4-Feb-10

GAS

START TIME : 8:05
END TIME : 9:05

Diluent/Pollutant:	O ₂ (%)	CO ₂ (%)
Operating Range =	20.91	18.8
Analyzer Zero Response =	0.28	0.10
Analyzer Span Response =	11.10	9.73
Sytem Zero Response (Initial) =	0.45	0.18
System Zero Response (Final) =	0.51	0.30
Average Zero Response (C _o) =	0.48	0.24
Sytem Span Response (Initial) =	10.77	9.76
System Span Response (Final) =	11.12	9.81
Average Span Response (C _m) =	10.95	9.79
Calibration gas values (C _{ma}) =	10.85	9.70
<u>System Bias and Drift Calculations:</u>		
Zero Bias (Initial) =	0.81	0.43
Zero Bias (Final) =	1.10	1.06
Zero Drift =	0.29	0.64
Span Bias (Initial) =	1.58	0.16
Span Bias (Final) =	0.10	0.43
Span Drift =	1.67	0.27
Uncorrected Ave. (\bar{C}) =	19.85	0.78
Corrected Ave. = $C_{gas} = (\bar{C} - C_o)(C_{ma} / (C_m - C_o)) =$	20.08	0.55

CEMS Calibrations and Calculations Sheet

PLANT : Global
LOCATION : RTO Outlet

RUN # : Run 3
DATE : 4-Feb-10

GAS

START TIME : 9:25
END TIME : 10:25

Diluent/Pollutant:	O ₂ (%)	CO ₂ (%)
Operating Range =	20.91	18.8
Analyzer Zero Response =	0.28	0.10
Analyzer Span Response =	11.10	9.73
Sytem Zero Response (Initial) =	0.51	0.30
System Zero Response (Final) =	0.46	0.32
Average Zero Response (C _o) =	0.49	0.31
Sytem Span Response (Initial) =	11.12	9.81
System Span Response (Final) =	11.05	9.91
Average Span Response (C _m) =	11.09	9.86
Calibration gas values (C _{ma}) =	10.85	9.70
<u>System Bias and Drift Calculations:</u>		
Zero Bias (Initial) =	1.10	1.06
Zero Bias (Final) =	0.86	1.17
Zero Drift =	0.24	0.11
Span Bias (Initial) =	0.10	0.43
Span Bias (Final) =	0.24	0.96
Span Drift =	0.33	0.53
Uncorrected Ave. (\bar{C}) =	19.69	0.79
Corrected Ave. = $C_{gas} = (\bar{C} - C_o)(C_{ma}/(C_m - C_o)) =$	19.66	0.49

[illegible]

Client/Site:

CAA / Global Oil

Source:

RTO

Operator:

J. Secker

Date:

2/4/10

RM Response Time:

Upscale (seconds):

15

Downscale (seconds):

15

Note: System Response Time is the longer of the upscale and downscale response times. Performed during initial zero and bias checks:

Analyzer Calibration Error (ACE) – Reference Method

Pollutant/Diluent	Low		Mid		High/Full Scale (CS)	
	Cylinder Value (C _v)	Analyzer Response (C _{DIR})	Cylinder Value (C _v)	Analyzer Response (C _{DIR})	Cylinder Value (C _v)	Analyzer Response (C _{DIR})
Oxygen	0.00	0.28	10.85	11.10	20.91	20.99
Carbon Dioxide	0.00	0.10	9.70	9.73	18.80	18.84

Range selected for analyzer operation:

O ₂	CO ₂	CO	NO _x	SO ₂
25%	20%	—	—	—

Protocol Gases Used During Program:

Cylinder No.	Diluent/Pollutant Concentrations(s)
CC25517	20.91 O ₂ / 18.80 CO ₂
CC313422	10.85 O ₂ / 9.70 CO ₂

Analyzer Calibration Error (ACE) Acceptance Criteria: $\leq \pm 2\%$

Where: $ACE = [(C_{DIR} - C_v)/CS] * 100\%$

Client/Site: CAA / Global Oil
 Source: RTD
 Operator: A. Seah
 Date: 2/4/10

Run Number: RTD-Run 1
 Start Time: 645
 End Time: 745

System Bias (SB)/Drift (D) Assessments – Reference Method

Pollutant/Diluent	Start Zero		Start Span (C _{MA})		Final Zero		Final Span (C _{MA})	
	Cylinder Value (C _V)	Analyzer Response (C _S)	Cylinder Value (C _V)	Analyzer Response (C _S)	Cylinder Value (C _V)	Analyzer Response (C _S)	Cylinder Value (C _V)	Analyzer Response (C _S)
Oxygen	0.00	0.46	10.85	11.01	0.00	0.45	10.85	10.77
Carbon Dioxide	0.00	0.15	9.70	9.69	0.00	0.18	9.70	9.76

Range selected for analyzer operation:

O ₂	CO ₂	CO	NO _x	SO _x
25%	20%	—	—	—

Sampling System Bias (SB) Criteria: $\leq \pm 5\%$ of span for zero and upscale gas, where:

Where: $SB = [(C_s - C_{br}) / CS] * 100\%$

Zero and Calibration Drift (D) Criteria: $\leq \pm 3\%$ of span, where

$D = |SB_{final} - SB_i|$

Client/Site: CAA / Global
 Source: RTO
 Operator: A. Seaba
 Date: 2/4/10

Run Number: RTO-Pun2
 Start Time: 605
 End Time: 905

System Bias (SB)/Drift (D) Assessments – Reference Method

Pollutant/Diluent	Start Zero			Start Span (C _{MA})			Final Zero			Final Span (C _{MA})	
	Cylinder Value (C _V)	Analyzer Response (C _S)		Cylinder Value (C _V)	Analyzer Response (C _S)		Cylinder Value (C _V)	Analyzer Response (C _S)		Cylinder Value (C _V)	Analyzer Response (C _S)
Oxygen	0.00	0.45		10.85	10.77		0.00	0.51		10.85	11.12
Carbon Dioxide	0.00	0.18		9.70	9.76		0.00	0.30		9.70	9.81

Range selected for analyzer operation:

O ₂	CO ₂	CO	NO _x	SO ₂
25.1	20.1	-	-	-

Sampling System Bias (SB) Criteria: $\leq \pm 5\%$ of span for zero and upscale gas, where:

Where: $SB = [(C_s - C_{00})/C_s] \times 100\%$

Zero and Calibration Drift (D) Criteria: $\leq \pm 3\%$ of span, where

$D = |SB_{final} - SB_i|$

Client/Site: CAA / G-bba1
 Source: RTD
 Operator: A. Seetha
 Date: 2/4/10

Run Number: RTD - Run 3
 Start Time: 925
 End Time: 1025

System Bias (SB)/Drift (D) Assessments – Reference Method

Pollutant/Diluent	Start Zero			Start Span (C _{MA})			Final Zero			Final Span (C _{MA})		
	Cylinder Value (C _V)	Analyzer Response (C _S)		Cylinder Value (C _V)	Analyzer Response (C _S)		Cylinder Value (C _V)	Analyzer Response (C _S)		Cylinder Value (C _V)	Analyzer Response (C _S)	
Oxygen	0.00	0.51		1085	11.12		0.00	0.46		1085	11.05	
Carbon Dioxide	0.00	0.30		9.70	9.81		0.00	0.32		9.70	9.91	

Range selected for analyzer operation:

O ₂	CO ₂	CO	NO _x	SO ₂
25%	20%	—	—	—

Sampling System Bias (SB) Criteria: $\leq \pm 5\%$ of span for zero and upscale gas, where:

Where: $SB = [(C_s - C_{br})/CS] * 100\%$

Zero and Calibration Drift (D) Criteria: $\leq \pm 3\%$ of span, where

$D = |SB_{final} - SB_i|$

B4 – Sulfur Results



COLUMBIA ANALYTICAL SERVICES, INC.

RESULTS OF ANALYSIS

Page 1 of 1

Client: CA Associates
Client Sample ID: INLET RUN 1
Client Project ID: Global RTO / 09-017

CAS Project ID: P1000755
CAS Sample ID: P1000755-001

Test Code: ASTM D 5504-08
Instrument ID: Agilent 6890A/GC13/SCD
Analyst: Zheng Wang
Sampling Media: 1.0 L Zefon Bag
Test Notes:

Date Collected: 3/3/10
Time Collected: 13:56
Date Received: 3/4/10
Date Analyzed: 3/4/10
Time Analyzed: 08:24
Volume(s) Analyzed: 1.0 ml(s)

CAS #	Compound	Result µg/m³	MRL µg/m³	Result ppbV	MRL ppbV	Data Qualifier
7783-06-4	Hydrogen Sulfide	11	7.0	8.2	5.0	
463-58-1	Carbonyl Sulfide	ND	12	ND	5.0	
74-93-1	Methyl Mercaptan	39	9.8	20	5.0	
75-08-1	Ethyl Mercaptan	27	13	10	5.0	
75-18-3	Dimethyl Sulfide	ND	13	ND	5.0	
75-15-0	Carbon Disulfide	ND	7.8	ND	2.5	
75-33-2	Isopropyl Mercaptan	ND	16	ND	5.0	
75-66-1	tert-Butyl Mercaptan	ND	18	ND	5.0	
107-03-9	n-Propyl Mercaptan	ND	16	ND	5.0	
624-89-5	Ethyl Methyl Sulfide	ND	16	ND	5.0	
110-02-1	Thiophene	83	17	24	5.0	
513-44-0	Isobutyl Mercaptan	ND	18	ND	5.0	
352-93-2	Diethyl Sulfide	ND	18	ND	5.0	
109-79-5	n-Butyl Mercaptan	ND	18	ND	5.0	
624-92-0	Dimethyl Disulfide	59	9.6	15	2.5	
616-44-4	3-Methylthiophene	110	20	26	5.0	
110-01-0	Tetrahydrothiophene	32	18	8.9	5.0	
638-02-8	2,5-Dimethylthiophene	39	23	8.4	5.0	
872-55-9	2-Ethylthiophene	52	23	11	5.0	
110-81-6	Diethyl Disulfide	ND	12	ND	2.5	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.

MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

Verified By: _____ Date: _____

COLUMBIA ANALYTICAL SERVICES, INC.

RESULTS OF ANALYSIS

Page 1 of 1

Client: CA Associates
Client Sample ID: INLET RUN 2
Client Project ID: Global RTO / 09-017

CAS Project ID: P1000755
CAS Sample ID: P1000755-002

Test Code: ASTM D 5504-08
Instrument ID: Agilent 6890A/GC13/SCD
Analyst: Zheng Wang
Sampling Media: 1.0 L Zefon Bag
Test Notes:

Date Collected: 3/3/10
Time Collected: 14:10
Date Received: 3/4/10
Date Analyzed: 3/4/10
Time Analyzed: 08:46
Volume(s) Analyzed: 1.0 ml(s)

CAS #	Compound	Result µg/m ³	MRL µg/m ³	Result ppbV	MRL ppbV	Data Qualifier
7783-06-4	Hydrogen Sulfide	ND	7.0	ND	5.0	
463-58-1	Carbonyl Sulfide	ND	12	ND	5.0	
74-93-1	Methyl Mercaptan	ND	9.8	ND	5.0	
75-08-1	Ethyl Mercaptan	ND	13	ND	5.0	
75-18-3	Dimethyl Sulfide	ND	13	ND	5.0	
75-15-0	Carbon Disulfide	ND	7.8	ND	2.5	
75-33-2	Isopropyl Mercaptan	ND	16	ND	5.0	
75-66-1	tert-Butyl Mercaptan	ND	18	ND	5.0	
107-03-9	n-Propyl Mercaptan	ND	16	ND	5.0	
624-89-5	Ethyl Methyl Sulfide	ND	16	ND	5.0	
110-02-1	Thiophene	ND	17	ND	5.0	
513-44-0	Isobutyl Mercaptan	ND	18	ND	5.0	
352-93-2	Diethyl Sulfide	ND	18	ND	5.0	
109-79-5	n-Butyl Mercaptan	ND	18	ND	5.0	
624-92-0	Dimethyl Disulfide	ND	9.6	ND	2.5	
616-44-4	3-Methylthiophene	ND	20	ND	5.0	
110-01-0	Tetrahydrothiophene	ND	18	ND	5.0	
638-02-8	2,5-Dimethylthiophene	ND	23	ND	5.0	
872-55-9	2-Ethylthiophene	ND	23	ND	5.0	
110-81-6	Diethyl Disulfide	ND	12	ND	2.5	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.

MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

Verified By: _____ Date: _____

COLUMBIA ANALYTICAL SERVICES, INC.

RESULTS OF ANALYSIS

Page 1 of 1

Client: CA Associates
Client Sample ID: INLET RUN 3
Client Project ID: Global RTO / 09-017

CAS Project ID: P1000755
CAS Sample ID: P1000755-003

Test Code: ASTM D 5504-08
Instrument ID: Agilent 6890A/GC13/SCD
Analyst: Zheng Wang
Sampling Media: 1.0 L Zefon Bag
Test Notes:

Date Collected: 3/3/10
Time Collected: 14:20
Date Received: 3/4/10
Date Analyzed: 3/4/10
Time Analyzed: 09:08
Volume(s) Analyzed: 1.0 ml(s)

CAS #	Compound	Result µg/m³	MRL µg/m³	Result ppbV	MRL ppbV	Data Qualifier
7783-06-4	Hydrogen Sulfide	ND	7.0	ND	5.0	
463-58-1	Carbonyl Sulfide	ND	12	ND	5.0	
74-93-1	Methyl Mercaptan	ND	9.8	ND	5.0	
75-08-1	Ethyl Mercaptan	ND	13	ND	5.0	
75-18-3	Dimethyl Sulfide	ND	13	ND	5.0	
75-15-0	Carbon Disulfide	ND	7.8	ND	2.5	
75-33-2	Isopropyl Mercaptan	ND	16	ND	5.0	
75-66-1	tert-Butyl Mercaptan	ND	18	ND	5.0	
107-03-9	n-Propyl Mercaptan	ND	16	ND	5.0	
624-89-5	Ethyl Methyl Sulfide	ND	16	ND	5.0	
110-02-1	Thiophene	ND	17	ND	5.0	
513-44-0	Isobutyl Mercaptan	ND	18	ND	5.0	
352-93-2	Diethyl Sulfide	ND	18	ND	5.0	
109-79-5	n-Butyl Mercaptan	ND	18	ND	5.0	
624-92-0	Dimethyl Disulfide	ND	9.6	ND	2.5	
616-44-4	3-Methylthiophene	ND	20	ND	5.0	
110-01-0	Tetrahydrothiophene	ND	18	ND	5.0	
638-02-8	2,5-Dimethylthiophene	ND	23	ND	5.0	
872-55-9	2-Ethylthiophene	ND	23	ND	5.0	
110-81-6	Diethyl Disulfide	ND	12	ND	2.5	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.

MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

Verified By: _____ Date: _____

COLUMBIA ANALYTICAL SERVICES, INC.

RESULTS OF ANALYSIS

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Client: CA Associates
Client Project ID: Global RTO / 09-017

CAS Project ID: P1000755

Total Reduced Sulfur as Hydrogen Sulfide

Test Code: ASTM D 5504-08
Instrument ID: Agilent 6890A/GC13/SCD
Analyst: Zheng Wang
Sampling Media: 1.0 L Zefon Bag(s)
Test Notes:

Date(s) Collected: 3/3/10
Date Received: 3/4/10
Date Analyzed: 3/4/10

Client Sample ID	CAS Sample ID	Injection	Time Analyzed	Result µg/m ³	MRL µg/m ³	Result ppbV	MRL ppbV	Data Qualifier
		Volume ml(s)						
INLET RUN 1	P1000755-001	1.0	08:24	460	7.0	330	5.0	
INLET RUN 2	P1000755-002	1.0	08:46	ND	7.0	ND	5.0	
INLET RUN 3	P1000755-003	1.0	09:08	ND	7.0	ND	5.0	
Method Blank	P100304-MB	1.0	07:34	ND	7.0	ND	5.0	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.

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COLUMBIA ANALYTICAL SERVICES, INC.**RESULTS OF ANALYSIS**

Page 1 of 1

Client: CA Associates
Client Sample ID: Method Blank
Client Project ID: Global RTO / 09-017

CAS Project ID: P1000755
CAS Sample ID: P100304-MB

Test Code: ASTM D 5504-08
Instrument ID: Agilent 6890A/GC13/SCD
Analyst: Zheng Wang
Sampling Media: 1.0 L Zefon Bag
Test Notes:

Date Collected: NA
Time Collected: NA
Date Received: NA
Date Analyzed: 3/04/10
Time Analyzed: 07:34
Volume(s) Analyzed: 1.0 ml(s)

CAS #	Compound	Result µg/m ³	MRL µg/m ³	Result ppbV	MRL ppbV	Data Qualifier
7783-06-4	Hydrogen Sulfide	ND	7.0	ND	5.0	
463-58-1	Carbonyl Sulfide	ND	12	ND	5.0	
74-93-1	Methyl Mercaptan	ND	9.8	ND	5.0	
75-08-1	Ethyl Mercaptan	ND	13	ND	5.0	
75-18-3	Dimethyl Sulfide	ND	13	ND	5.0	
75-15-0	Carbon Disulfide	ND	7.8	ND	2.5	
75-33-2	Isopropyl Mercaptan	ND	16	ND	5.0	
75-66-1	tert-Butyl Mercaptan	ND	18	ND	5.0	
107-03-9	n-Propyl Mercaptan	ND	16	ND	5.0	
624-89-5	Ethyl Methyl Sulfide	ND	16	ND	5.0	
110-02-1	Thiophene	ND	17	ND	5.0	
513-44-0	Isobutyl Mercaptan	ND	18	ND	5.0	
352-93-2	Diethyl Sulfide	ND	18	ND	5.0	
109-79-5	n-Butyl Mercaptan	ND	18	ND	5.0	
624-92-0	Dimethyl Disulfide	ND	9.6	ND	2.5	
616-44-4	3-Methylthiophene	ND	20	ND	5.0	
110-01-0	Tetrahydrothiophene	ND	18	ND	5.0	
638-02-8	2,5-Dimethylthiophene	ND	23	ND	5.0	
872-55-9	2-Ethylthiophene	ND	23	ND	5.0	
110-81-6	Diethyl Disulfide	ND	12	ND	2.5	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.

MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

Verified By: _____ Date: _____